

In the Claims:

1. (Currently amended) A method of discovering, diagnosing and correcting formation integrity problems in successively drilled subterranean well bore intervals comprising the steps of:

(a) drilling a first well bore interval;

~~(a)~~ (b) determining if well bore fluid is being lost from ~~each~~ said drilled well bore interval or if pressurized formation fluid is flowing into ~~each~~ said drilled well bore interval, or both;

~~(b)~~ (c) determining the pressure containment integrity of ~~each~~ said drilled well bore interval;

~~(c)~~ (d) if it is determined that well bore fluid is being lost from a said drilled well bore interval or pressurized formation fluid is flowing into said drilled well bore interval, or both, in step ~~(a)~~ (b) or if it is determined that said pressure containment integrity is inadequate in step ~~(b)~~ (c), providing a pumpable sealing composition for sealing said drilled well bore interval to prevent well bore fluid outflow therefrom, to prevent pressurized formation fluid inflow thereinto or to increase the pressure containment integrity of said drilled well bore interval; ~~and~~

~~(d)~~ (e) pumping said sealing composition into said drilled well bore interval to cause said drilled well bore interval to be sealed or the pressure containment integrity of said drilled well bore interval to be increased, or both;

(f) drilling a second well bore interval; and

(g) repeating steps (b), (c), (d) and (e) for the second drilled well bore interval.

2. (Currently amended) The method of claim 1 wherein step ~~(a)~~ (b) comprises circulating a well bore fluid through said drilled well bore interval for a period of time sufficient

to determine if the quantity of said well bore fluid being circulated decreases due to well bore fluid outflow from said drilled well bore interval or increases due to pressurized formation fluid inflow into said drilled well bore interval.

3. (Original) The method of claim 2 wherein said well bore fluid is drilling fluid.

4. (Currently amended) The method of claim 1 wherein if it is determined that well bore fluid outflow from said drilled well bore interval is occurring or pressurized formation fluid inflow into said drilled well bore interval is occurring, or both, step ~~(a)~~ (b) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said well bore fluid outflow or formation fluid inflow, or both.

5. (Currently amended) The method of claim 1 wherein step ~~(b)~~ (c) comprises increasing the density of or pressure exerted on a well bore fluid in said drilled well bore interval to an equivalent well bore fluid weight greater than or equal to the maximum hydrostatic pressure and friction pressure level to be exerted in said drilled well bore interval to determine if leak off occurs and the pressure containment integrity of said drilled well bore interval is inadequate.

6. (Original) The method of claim 5 wherein said well bore fluid is drilling fluid.

7. (Currently amended) The method of claim 5 wherein if the pressure containment integrity is inadequate, step ~~(b)~~ (c) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said inadequate pressure integrity containment.

8. (Currently amended) The method of claim 1 wherein when a pumpable sealing composition is provided in step ~~(e)~~ (d), the pumpable sealing composition has the properties of

rapidly converting into high viscosity sealing masses upon commingling and reacting with well bore fluids which are diverted into, seal and strengthen weak zones and openings in the drilled well bore interval through which well bore fluid outflows or pressurized formation fluid inflows into said drilled well bore interval.

9. (Original) The method of claim 1 wherein said pumpable sealing composition reacts with water in said drilled well bore interval and is comprised of oil, a hydratable polymer, an organophillic clay and a water swellable clay.

10. (Original) The method of claim 1 wherein said pumpable sealing composition reacts with oil in said drilled well bore interval and is comprised of water, an aqueous rubber latex, an organophillic clay, sodium carbonate and a hydratable polymer.

11. (Original) A method of discovering, diagnosing and correcting formation integrity problems in successively drilled subterranean well bore intervals comprising the steps of:

- (a) drilling a first well bore interval;
- (b) determining if well bore fluid is outflowing from said first drilled well bore interval or if pressurized formation fluid is inflowing into said first drilled well bore interval;
- (c) determining the pressure containment integrity of said first drilled well bore interval;
- (d) if it is determined that well bore fluid is outflowing or pressurized formation fluid is inflowing into said first drilled well bore interval in step (b) or if it is determined that said pressure containment integrity is inadequate in said first drilled well bore interval in step (c), or both, performing the additional steps of:

(1) running well bore logs and collecting other relevant well bore data in said first well bore interval in real time,

(2) transmitting all real time data collected to a location where a specific treatment using a specific pumpable sealing composition is determined,

(3) providing said specific pumpable sealing composition at said well site, and

(4) performing said specific treatment including pumping said sealing composition into said first drilled well bore interval to cause said first drilled well bore interval to be sealed or the pressure containment integrity to be increased, or both; and

(e) repeating steps (a), (b), (c) and (d) for each additional drilled well bore interval until the total well bore depth is reached.

12. (Original) The method of claim 11 wherein step (b) comprises circulating a well bore fluid through said drilled well bore interval for a period of time sufficient to determine if the quantity of said well bore fluid being circulated decreases due to well bore fluid outflow from said drilled well bore interval or increases due to pressurized formation fluid inflow into said drilled well bore interval.

13. (Original) The method of claim 12 wherein said well bore fluid is drilling fluid.

14. (Original) The method of claim 11 wherein if it is determined that well bore fluid outflow from said drilled well bore interval is occurring or pressurized formation fluid inflow into said drilled well bore interval is occurring, or both, step (b) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said well bore fluid outflow or formation fluid inflow, or both.

15. (Original) The method of claim 11 wherein step (c) comprises increasing the density of or pressure exerted on a well bore fluid in said drilled well bore interval to an equivalent well bore fluid weight greater than or equal to the maximum hydrostatic pressure and friction pressure level to be exerted in said drilled well bore interval to determine if the pressure containment integrity of said drilled well bore interval is inadequate.

16. (Original) The method of claim 15 wherein said well bore fluid is drilling fluid.

17. (Original) The method of claim 15 wherein if the pressure containment integrity is inadequate, step (c) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said inadequate pressure integrity containment.

18. (Original) The method of claim 11 wherein when a pumpable sealing composition is provided in accordance with step (d)(3), the pumpable sealing composition has the properties of rapidly converting into high viscosity sealing masses upon commingling and reacting with well bore fluids which are diverted into, seal and strengthen weak zones and openings in the drilled well bore interval through which well bore fluid outflows or pressurized formation fluid inflows into said drilled well bore interval.

19. (Original) The method of claim 11 wherein said pumpable sealing composition reacts with water in said drilled well bore interval and is comprised of oil, a hydratable polymer, an organophillic clay and a water swellable clay.

20. (Original) The method of claim 11 wherein said pumpable sealing composition reacts with oil in said drilled well bore interval and is comprised of water, an aqueous rubber latex, an organophillic clay, sodium carbonate and a hydratable polymer.

21. (New) The method of claim 11 wherein in step (d)(2), said real time data is transmitted to a remote location wherein a specific treatment using a specific pumpable sealing composition is determined.

22. (New) The method of claim 7 wherein said well logs are run and said other relevant data is collected in real time and the real time data is transmitted to a remote location wherein the specific pumpable sealing composition to utilize is determined.

23. (New) The method of claim 4 wherein said well logs are run and said other relevant data is collected in real time and the real time data is transmitted to a remote location wherein the specific pumpable sealing composition to utilize is determined.

24. (New) A method of correcting a formation integrity problem in a drilled subterranean well bore interval comprising the steps of:

(a) determining the natural pressure containment integrity of said drilled well bore interval;

(b) providing a pumpable sealing composition for increasing the pressure containment integrity of said drilled well bore interval; and

(c) pumping said sealing composition into said drilled well bore interval to cause the pressure containment integrity of said drilled well bore interval to be increased to a value greater than the natural pressure containment integrity of said interval; and

(d) after step (c), confirming that the pressure containment integrity of said drilled well bore interval has been increased to a value greater than the natural pressure containment integrity of said interval by increasing the density of or pressure exerted on a well bore fluid in said drilled well bore interval to an equivalent well bore fluid weight greater than or

equal to the maximum hydrostatic pressure and friction pressure level to be exerted in said drilled well bore interval and determining if leak off occurs.

25. (New) The method of claim 1 wherein step (a) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said formation integrity problem.

26. (New) The method of claim 2 wherein said well logs are run and said other relevant data is collected in real time and the real time data is transmitted to a remote location wherein the specific pumpable sealing composition to utilize is determined.

27. (New) The method of claim 1 wherein the pumpable sealing composition has the properties of rapidly converting into high viscosity sealing masses upon commingling and reacting with well bore fluids which are diverted into, seal and strengthen weak zones and openings in the drilled well bore interval.

28. (New) The method of claim 4 wherein said pumpable sealing composition reacts with water in said drilled well bore interval and is comprised of oil, a hydratable polymer, an organophillic clay and a water swellable clay.

29. (New) The method of claim 1 wherein said pumpable sealing composition reacts with oil in said drilled well bore interval and is comprised of water, an aqueous rubber latex, an organophillic clay, sodium carbonate and a hydratable polymer.

30. (New) A method of discovering, diagnosing and correcting formation integrity problems in successively drilled subterranean well bore intervals comprising the steps of:

(a) drilling a first well bore interval;

(b) determining if well bore fluid is being lost from said drilled well bore interval or if pressurized formation fluid is flowing into said drilled well bore interval, or both;

(c) determining the pressure containment integrity of said drilled well bore interval;

(d) if it is determined that well bore fluid is being lost from said drilled well bore interval or pressurized formation fluid is flowing into said drilled well bore interval, or both, in step (b) or if it is determined that said pressure containment integrity is inadequate in step (c), providing a pumpable sealing composition for increasing the pressure containment integrity of said drilled well bore interval and, if necessary, sealing said drilled well bore interval to prevent well bore fluid outflow therefrom or pressurized formation fluid inflow thereinto;

(e) pumping said sealing composition into said drilled well bore interval to cause the pressure containment integrity of said drilled well bore interval to be increased to a value greater than the natural fracture pressure of said interval and, if necessary, to cause said drilled well bore interval to be sealed;

(f) drilling a second well bore interval; and

(g) repeating steps (b), (c), (d) and (e) for the next drilled well bore interval.

31. (New) The method of claim 24 wherein step (b) comprises circulating a well bore fluid through said drilled well bore interval for a period of time sufficient to determine if the quantity of said well bore fluid being circulated decreases due to well bore fluid outflow from said drilled well bore interval or increases due to pressurized formation fluid inflow into said drilled well bore interval.

32. (New) The method of claim 24 wherein if it is determined that well bore fluid outflow from said drilled well bore interval is occurring or pressurized formation fluid inflow into said drilled well bore interval is occurring, or both, step (b) further comprises analyzing well



logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said well bore fluid outflow or formation fluid inflow, or both.

33. (New) The method of claim 26 wherein said well logs are run and said other relevant data is collected in real time and the real time data is transmitted to a remote location wherein the specific pumpable sealing composition to utilize is determined.

34. (New) The method of claim 24 wherein step (c) comprises increasing the density of or pressure exerted on a well bore fluid in said drilled well bore interval to an equivalent well bore fluid weight greater than or equal to the maximum hydrostatic pressure and friction pressure level to be exerted in said drilled well bore interval to determine if leak off occurs and the pressure containment integrity of said drilled well bore interval is inadequate.

35. (New) The method of claim 28 wherein if the pressure containment integrity is inadequate, step (c) further comprises analyzing well logs and other relevant well bore data collected in said drilled well bore interval to diagnose the cause and extent of said inadequate pressure integrity containment.

36. (New) The method of claim 29 wherein said well logs are run and said other relevant data is collected in real time and the real time data is transmitted to a remote location wherein the specific pumpable sealing composition to utilize is determined.

37. (New) The method of claim 1 wherein when a pumpable sealing composition is provided in step (d), the pumpable sealing composition has the properties of rapidly converting into high viscosity sealing masses upon commingling and reacting with well bore fluids which are diverted into, seal and strengthen weak zones and openings in the drilled well bore interval through which well bore fluid outflows or pressurized formation fluid inflows into said drilled well bore interval.

Respectfully submitted,

A handwritten signature in black ink that reads "Clifford C. Dougherty, III". The signature is written in a cursive style with a horizontal line underlining the name.

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